



## Stability of UV-visible spectrophotometric measurements for investigating the adsorption of hexavalent chromium from wastewater

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### ABSTRACT

Hexavalent chromium Cr(VI) is a carcinogenic and mutagenic heavy metal. It can be encountered in various industrial wastewater, the characterization of which and the evaluation of its removal efficiency require a successful quantification technique. There is no sufficient work in the literature investigating the time-stability of UV-vis spectra of Cr(VI) solutions. This paper fills a knowledge gap in Cr(VI) solution/color stability and the applicability of UV-spectrophotometry in Cr(VI) adsorption studies. The presented experimental results indicate that the absorbance of Cr(VI) solution at the previously reported maximum wavelength of 371 nm, is not repeatable. The addition of 1,5-diphenylcarbazide improves the UV-vis spectra and enhances its stability for spectrophotometric analysis within about 1 h. After that period, the stability decreases with time. The instability of these spectrophotometric measurements at longer times (i.e., after 1 h) was not reported in the previous studies or in the ISO standard method for determining the Cr(VI). This paper also applies this technique for monitoring and evaluating the adsorption treatment of Cr(VI)-contaminated wastewater (e.g., from electroplating) by solid waste micro-particles from stone cutting industry. The limestone particles are good adsorbents for the treatment of wastewaters contaminated with Cr(VI). A percentage removal of about 40% can be achieved for adsorbent dosage of 1 g (particles)/100 ml (solution).

*Keywords:* UV-visible spectrophotometry; Hexavalent chromium; Wavelength; Adsorption

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